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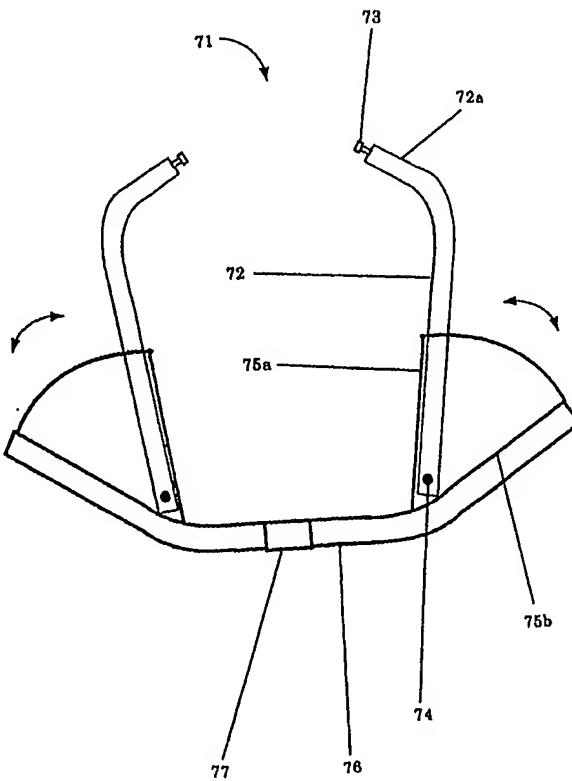
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(54) Title: CONFIGURABLE HANDLEBARS FOR BICYCLES

(57) Abstract

Bicycle handlebars (71) are moveable (or configurable) between at least two riding positions. The positions may be an aero position for faster riding in which extensions (72) are rotated about pivot (74) to a raised position adjacent face (75a), and a wide position in which extensions (72) are lowered to be adjacent face (75b). The position change is capable of being effected while riding, and without relinquishing control of and providing immediate access to the control levers such as the brake and gear levers. Multiple locking positions may exist between faces (75a, 75b) on the guides.



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## CONFIGURABLE HANDLEBARS FOR BICYCLES

TECHNICAL FIELD

This invention relates to improvements to steering devices.

More specifically, the present invention relates to improvements to  
5 cycle handlebars. It should be appreciated that the principles of the  
present invention may apply to other steering devices.

BACKGROUND ART

Cycling is a recreational activity and in terms of sporting activities, is  
very popular. Cycling features in major sporting events such as  
10 Olympics, Commonwealth Games and at world, national and regional  
events.

Riders are often bunched together during these events. It is important  
during these times that the rider has as much control over the cycle as  
possible. Stability is best maintained when the rider has both hands  
15 gripped on the handlebars, and where the hands are in contact or in  
the proximity of gear and brake levers. This safety requirement is  
important at all times during a ride.

The grip on the handlebars at all times is often relinquished during  
competition racing, usually when the rider is making a transition from  
20 a wide grip position to an aero position. The aero position is the  
typical position taken when a rider is using aerobars.

The term grip may mean to hold to support the riders upper body and  
facilitate balance and directional control.

Aerobars were developed for cycle racing around 1987. They are an accessory that clip onto conventional handlebars so that the rider may assume a more streamlined riding position.

They usually have two handles which extend forward from the 5 conventional handlebars and are close together, approximately 150mm apart.

Padded arm rests can be incorporated into aero bar accessories to support the forearms near to the elbows.

Aerobars have allowed the rider to assume a compact streamlined 10 position, which has been shown to improve speed and efficiency by around 5%.

One problem with the aerobar system is that steering control is not as positive as with conventional bars. The forward position of the aerobars means that smaller movements of the rider are translated 15 into larger movements on the steering mechanism.

There has previously been no easy access to brakes or gear change levers on aerobars.

Brake levers, gear change levers and combined brake and gear change 20 levers such as the Shimano STI system are usually remote from the aerobars. Therefore when the rider is in the aero position, control of the bicycle is compromised.

Aerobars have therefore been outlawed for conventional cycle racing, and have been attributed to some major crashes during bunch riding.

However, triathlon, duathlon, and time trial cycle racing do permit the use of aerobars.

The aero position is also used whenever possible. This may be on open roads, during head winds, and most times that the rider settles into a 5 steady racing rhythm. This may be for the bulk of the distance travelled by the rider.

Wide or conventional grip positions are used when mounting the bike or travelling at slow speeds. This may include starting off or slowing to a stop. The wide position is also used when the rider is off the seat, 10 supporting their weight on the pedals. During hill climbing, or other times of slower speeds, the wide position provides a more comfortable and more efficient method of riding. The wide position is also used when gear changes are made or braking is necessary, as the braking and control levers are located near the grips at the wide position.

15 On handle bars that include a downwardly curved portion at either ends, a lower wide position (the "drops" position) is achievable. This position is more usually associated with conventional cycle racing, as opposed to triathlon riding. The gear change levers are often remote from this position, and in any case often require relinquishing grip in 20 order to effect a gear change.

A further problem with conventional aero bar systems is that although the rider is in a more streamlined position in the aero position, the handlebars that are used in the wide position remain in the air stream, and provide drag, which may slow the rider down or expend energy.

The existence of two sets of handlebars also adds to the weight of the cycle, which may reduce riding efficiency and speed.

One example of adjustable handlebars is New Zealand Patent No. 102780. However, this document discloses a device which only 5 provides for lateral movement of the handlebars and does not enable the handlebar to be fixed into multiple positions. This is obviously not practical for competitive riding.

This device is also not adjustable while the bicycle is being ridden.

What is required then is a handlebar apparatus which provides for 10 improved control, drag efficiency, and access to gear change and brake levers, in all required positions. Which can also be adjusted while the bicycle is being ridden.

It is an object of the present invention to address the foregoing problems or at least to provide the public with a useful choice.

15 Further aspects and advantages of the present invention will become apparent from the ensuing description which is given by way of example only.

#### DISCLOSURE OF INVENTION

According to one aspect of the present invention there is provided 20 apparatus for control of a vehicle by a rider, including, handlebars moveable to at least two positions,

characterised in that the handlebars are capable of being moved from a first position to another position by the rider and are capable of being

fixed in at least one position by the rider.

Reference to handlebars will now be made with reference to bicycle handlebars. This should not be seen to be limiting however as the principles of the present invention maybe applied to other steering mechanisms requiring multiple positioning.

5 Reference to handlebars may include any part of the mechanism used to control or direct or steer or maintain balance of the bicycle. The term handlebars may include controls for braking or gear changing and may also include at least one handle or area used to grip or control 10 the steering mechanism. The plural should also be interpreted to encompass a single handlebar.

The handlebars may include a gripping area, to be gripped by the rider.

Reference to at least two positions will be made with reference to the 15 first position being a position seen when riders are using aerobars and/or the riding position taken when a rider is assuming a more streamlined position.

This maybe hereafter referred to as the aero position.

Reference to another position may be made with reference to the more 20 upright position seen when riders are gripping conventional handlebars, in times of acceleration, braking, hill climbing or gear changing.

This position shall be hereafter referred to as the wide position.

The wide position may also incorporate a "drops" position, being the riding position where a rider grips conventional downwardly curved handlebars.

Sometimes riders have their hands gripped on the horizontal straight 5 section of conventional handlebars nearer the middle of the handle bars. This position may also be a position within the definition.

The above definitions should not be seen to be limiting the scope of the present invention's manufacture or use, as other positions may be achieved without departing from the scope of the present invention.

10 At least two positions may also refer to transitory positions between the aero and wide position, or other positions that may conceivably be taken by a rider.

The positions may be discrete or continuous.

Throughout this specification, reference to a rider may be made with 15 reference to someone who is in the act of riding the bike, as distinguished from a rider who may have stopped and may be adjusting or maintaining the bike.

Reference to the handlebars being capable of being fixed in at least one position by the rider in this specification may refer to the handlebars 20 being able to be fixed in the positions previously referred to.

In preferred embodiments, the handlebars may be fixed in the desired position using a releasable locking or latching mechanism, with an actuator.

Preferably, the actuator may be a button, lever, switch or some other device.

In preferred embodiments however, the actuator may be a button.

Preferably, the actuator may be operable by the thumbs of the rider.

5 In some embodiments, the actuator may reverse the pushing motion of

the button to a pulling motion that releases the lockable mechanism. This may preferably be achieved by the use of a fixed outer casing movably attached at one end to the button and fixably attached at another end.

10 The wire or cable used to release the lockable mechanism, may be fixed

at the button end to some anchor point and may pass through the end of the casing distal from the button end to the locking mechanism.

The flexure of the outer casing caused by the button movement may

cause the cable to be withdrawn within the casing. This causes the

15 end of the cable to be drawn within or toward the casing, providing a pulling force or some other movement.

The above mechanism should not be seen to be limiting however, as

other methods of releasing the lockable mechanism maybe used.

20 The advantage of the above mechanism is that it is simply constructed, and cheap to manufacture. It also provides for less moving parts,

which increases the durability in its effectiveness in dirty conditions.

It may also be manufactured from parts readily available for bicycles.

In preferred embodiments, the present invention may include at least

one adjustable stop, to adjust the range of movement that may define

the difference between the aero and the wide position.

This has an advantage in that riders with different needs in terms of the handlebar configuration may be accommodated, increasing the efficiency and comfort of their ride.

5 In other embodiments, the handlebars may be segmented, to accommodate different riding styles and positions. The segments may be individually lockable in their respective orientations.

The present invention may have provision for adjustment of the dimensions and/or the position of the handlebars to suit the preference  
10 of the rider.

There may be provided an orientation adjustment means facilitating adjustment of the orientation of the handlebars.

There may also be provided a length adjustment means to adjust the length of the handlebars.

15 In some embodiments the adjustments may be by way of a latch or a clamp, but other adjustment means may be used in accordance with the present invention.

The length of the handlebars may refer to the distance between the handlebar stem and the gripping area on the handlebars.

20 The orientation of the handlebars may refer to the ability to alter the location of the gripping area of the handlebars in, say, the aero position, according to the preference of the rider.

The orientation adjustment means allows the rider to control the rider to control the degree to which the movement of the handlebars is thorough the vertical or horizontal planes.

Thus, the aero position may be higher for some riders, or lower for 5 others.

The change in orientation may be to rotate the handlebar assembly.

The present invention provides an apparatus for use by a rider of a bicycle that allows multiple lockable positions for the handlebars. These lockable positions may correspond to the particular riding 10 position that a rider may take during a ride.

The aero position may be employed whenever possible, due to the streamlined position this provides. For example, on open roads, during headwinds, or anytime once the rider settles into a steady racing rhythm.

15 The wide position may be taken when mounting the bike, when travelling at slow speeds such as starting off or slowing to stop, or when the rider is off the seat in times of hard acceleration or hill climbing.

20 Although the preferred embodiment moves in an arc between positions, other embodiments may move in a straight line or rotate through different planes on more than one axis, with out departing from the scope of the present invention.

In some embodiments, the handles may have a centering link, that may cause the handlebars to move in unison. This would have an

advantage in that steering control could be maintained during transitional periods.

The present invention has the following advantages.

Previously, when a rider was in the aero position in conventional 5 aerobars, there was no immediate access to the brake and gear change levers.

These levers were positioned on the conventional handlebar positions, which meant in order to effect a braking motion or a gear change, the 10 rider must change riding or hand positions to the wide, conventional riding position.

Where the levers were placed on the aerobars this only made it easier to change gear in the aero position.

However, in that case the rider would have no quick access to the levers in the wide position.

15 The present invention provides a system whereby a rider can effect wide and aero riding positions while still having immediate access to gear change and brake levers.

The present invention may compliment existing brake and gear change lever technologies, by providing access to them when the rider 20 is in the aero position.

Timing a gear change during a ride is of crucial importance. Due to the time taken to change from the aero position to the wide position in previous handlebar technology, the timing of the gear change was more

difficult to effect accurately, and hence riding efficiency suffered as a consequence.

The present invention provides for a rider to time a gear change more efficiently, as the gear change levers are accessible at all times and in 5 all riding positions.

Similarly, when riding close to other riders or in traffic, a cyclist may need to match speed with the vehicle or cycle in front. The levers are readily accessible on the present invention, and therefore reduces the risk of over-running the vehicle in front, by ready access to the brake 10 lever.

Thus, the main cause of bunch riding accidents, being a lack of access to the brake levers, is alleviated or minimised.

Furthermore, the present invention provides for a more lightweight apparatus, because extraneous structures are removed from the 15 handlebars.

Previously, the aerobars were combined with conventional bars, adding to the weight of the bike.

In the present invention, the handlebars used in the aero position and the wide position are the same, reducing the weight of the bike, and 20 therefore increasing the efficiency of the ride.

Drag in terms of air resistance is also reduced, as the handlebars used in the aero position and the wide position are the same.

Thus, there is no extraneous handlebar structure causing drag when the rider is in the aero position as would have previously been caused by the conventional handlebars.

This improves the mechanical efficiency of the ride, which allows for an 5 increase in speed or a conservation of the riders energy.

In order to effect the changing of the position of the handlebars, the rider need not relinquish control of the bicycle by removing or releasing their grip from the handlebars.

The nature of the present invention means that a grip may be 10 maintained at all times and in all positions of the handlebars, and during the transition from one position to another, and while braking and gear-changing.

The gear change/braking action previously took the riders attention away from the path ahead. This potentially resulted in the risk of 15 accident.

The present invention permits instant access to the control levers in all riding positions without the rider having to take their eyes off the path ahead and therefore potentially reduces the risk of accident.

Therefore the safety of the rider is increased, as control of the bicycle is 20 maintained throughout the motion.

It is possible that the advantages of the present invention may mean that the aero position may become allowable in bunch riding in the future.

The present invention allows a rider to choose between an aero position and the wide position, or the wide position and the drops position.

The drops position is also adjustable to meet the preferences of the  
5 rider.

#### BRIEF DESCRIPTION OF DRAWINGS

Further aspects of the present invention will become apparent from the following description which is given by way of example only and with reference to the accompanying drawings in which:

10 Figure 1 shows a representation of the present invention in the Aero position, and  
Figure 2 shows the present invention in the wide position, and  
Figure 3 provides an example of conventional cycle handlebars, and  
Figure 4 shows one embodiment of the present invention in the aero position, and  
15 Figure 5 shows an example of the release mechanism of a preferred embodiment.

Figures 6&7 shows a further embodiment of the present invention.

#### BEST MODES FOR CARRYING OUT THE INVENTION

20 With reference to Figure 1 a set of handlebars (1) according to the present invention. The handlebars (1) are mounted on a bicycle (2), having a rider (3).

The handlebars (1) are attached to the bicycle (2) via attachment means (4).

The handlebars (1) include a gripping area (5) where the rider (3) grips the handlebars (1).

- 5 Also provided at the gripping mechanism is a button at point (5a) actuatable by the rider's thumb.

The handlebars (1) include extensions (6).

Guide (7) is provided, and is pivotally attached to member (6).

- 10 Bicycle control levels (8), which may be conventional braking, gear change levers, or may include combination gear/brake change levers such as the Shimano STI System.

The button (5a) actuates a release mechanism allowing the handlebars (1) to be moved to at least one further position throughout the arc of travel of the guide (7).

- 15 The position shown in Figure 1 is the wide position as previously herein before defined.

- 20 Upon actuation of the release mechanism by the depression of button (5a) by the thumb of rider (3), the handlebars (1) may be moved from the wide position shown in Figure 1 to a further position, which may include the aero position shown in Figure 2.

Figure 2 shows the rider (3) in the aero position, with the members (6) pivoted to the upper extreme position of guide (7).

It is envisaged that the arc of travel within guide (7) may be adjustable

by the appropriate mechanical adjustment means.

Although not expressly shown in Figure 1 or Figure 2, there may be provided at connection point (4) a mechanism that allows the two handlebars to move in unison to the desired position.

5 Further, the connection point (4) may also include an orientation adjustment means whereby the orientation of the handlebars may be adjusted.

For example for any given position, say the aero position shown in Figure 2, the orientation of the handlebars may be chosen according to 10 the preferences of the rider. For example the rider may prefer the aero position to be higher or lower than is shown in Figure 2.

Likewise, the wide position shown in Figure 1 may be adjusted to be higher or lower using the orientation adjustment means.

15 The orientation adjustment means may in some embodiments allow the handlebars to rotate towards or away from the rider as desired.

Further, although not expressly shown in Figures 1 or 2, the length of extension (6) may also be adjustable using a length adjustment means.

Thus the distance between the rider and the gripping portion (5) of the handlebars may be adjusted individually, according to the preferences 20 of the rider.

The length adjustment means may include clamps, latches and so forth.

It can be seen from Figures 1 and 2 that in all positions achievable,

including the wide and the aero position, the rider has instant access to the bicycle control levers (8). The rider (3) need not relinquish or compromise control of the bicycle in order to either achieve the aero or the wide position, or to use the vehicle controls (8).

5 As a result the present invention increases the safety of the rider, while providing the ability for the rider to customise the settings of the handlebars to achieve optimum comfort levels, which translate to more efficient riding.

A further advantage of the present invention is demonstrated by  
10 reference to Figures 3 and 4.

Figure 3 shows conventional handlebars (32), with aerobars (33) attached. The rider (30) in Figure 3 represents a rider in an aero position.

It can be seen that when the aero position is used, although the rider  
15 theoretically assumes a more streamlined position by hunching forward, the conventional handlebars (32) still remain in the path of the air flow (34), and increases drag by interrupting the air flow at point (35).

The present invention shown in Figure 4, which is a plan view of the  
20 position illustrated in Figure 2, it can be seen that the air flow (42) is not disrupted by the presence of extraneous attachments such as the conventional handlebars (32).

Therefore the present invention provides for less drag, and a more efficient and potentially faster ride of the bicycle (41).

With reference to Figure 5 there is shown a view of the extension (6) with a schematic diagram of the release mechanism used to release and lock the handlebars in place in the preferred embodiment.

Extension (6) includes on it's interior, a cable (51) which is surrounded by an outer casing (50). The outer tube (50) is fixed at point (53) of 5 extension (6) and is attached to the button (53) at the other end of the section.

The cable (51) is fixed at point (52) to the gripping portion (5) of the extension (6) and extends at the distal end to an aperture (54) to a 10 further releasing means which is not shown.

When the button (5a) is moved in the direction of the movement arrow shown, this will cause the outer casing (50) to move and flex. This results in a corresponding inward movement of the cable (51) shown by the direction arrow near the aperture (54) which corresponds to the 15 cable being withdrawn into the aperture (54).

This mechanism is used to release the handlebars from one lockable position to the second lockable position.

With reference to all the figures, the present invention may include arm rests for use when in the aero position.

20 According to Figures 6 and 7 there is shown an alternative embodiment of the present invention shown by general arrow (71). The position in Figure 7 is the aero position as previously described, used by riders to achieve a fast, streamlined ride.

Handlebars (71) include extensions (72) which largely consist of an elongated portion pivoted at one end and an inwardly bent gripping area 72a with a release button (73). The handlebars are pivoted at points (74). Guides (75) determine the range of movement of the handlebars from the first lockable position to the second lockable 5 position. The guides (75) may include extra stops, which are not shown, which may be used to adjust the range of movement.

The handlebars (71) also include an attachment means (76) which may be attached to the bike at point (77). The extensions (72) are pivotable 10 from points (74) and multiple lockable positions may exist between points (75a) and (75b) on the guides.

With reference to Figure 7 the same set of handlebars are shown as in Figure 6, however the extensions (72) are now in the wide position, which is used in hill climbing, times of acceleration, and at the start or 15 the end of a ride. The handlebars are now locked at point (75b) of the guide (75).

The present invention allows the rider to move the handlebars from the wide to the aero position and visa versa, and to be locked in any position without relinquishing the grip of the handlebars, while still 20 having ready access to the brake and gear change levers, and thus maintaining control of the bicycle.

Furthermore, the present invention may be adjusted to optimally suit the dimensions and riding characteristics and preferences of a particular rider to achieve optimum comfort positions and aerodynamic 25 efficiency.

Aspects of the present invention have been described by way of example only and it should be appreciated that modifications and additions may be made thereto without departing from the scope thereof as defined in the appended claims.

THE CLAIMS DEFINING THE INVENTION ARE:

1. Apparatus for steering control of a vehicle by a rider including,  
handle bars moveable to at least two positions,  
characterised in that  
the handle bars are capable of being moved from a first position to another  
position by the rider, and  
the handle bars are capable of being fixed in at least one position by the  
rider.
2. Apparatus as claimed in claim 1 wherein the handle bars are fixable at the  
two positions by the rider.
3. Apparatus as claimed in any one of claims 1 to 2 wherein the handle bars  
are bicycle handle bars, wherein  
the first position is a wide position, and  
the second position is an aero position.
4. Apparatus as claimed in any one of claims 1 to 3 wherein the handle bars  
include a releasable locking mechanism allowing the handlebars to be  
releasably locked in the desired position.
5. Apparatus as claimed in any one of claims 1 to 4 wherein the handle bars  
include a gripping area to be gripped by a rider, wherein vehicle control  
mechanisms, and the actuator for the releasable locking mechanism are  
accessible from the gripping area.

6. Apparatus as claimed in any one of claims 1 to 5 wherein the handle bars are moveable between the first and the second position in an arcuate movement from a handle bar pivot point.
7. Apparatus as claimed in claim 6 wherein the range of arcuate is adjustable.
8. Apparatus as claimed in any one of claims 1 to 7 wherein the handle bars include a centering link that causes the individual handle bars to move in unison.
9. Apparatus as claimed in any one of claims 1 to 8 wherein the handle bars include at least one mounting block enabling the orientation of the handle bars to be adjusted.
10. Apparatus as claimed in claim 9 wherein the mounting block allows the handle bars to be rotated.
11. Apparatus as claimed in either of claims 9 or 10 wherein the mounting block allows the handle bars to be moveable lengthways.
12. Apparatus as substantially described herein with reference to and as illustrated by the accompanying drawings.

## AMENDED CLAIMS

[received by the International Bureau on 03 December 1999 (03.12.99);  
original claims 1 - 12 replaced by amended claims 1 - 10 (2 pages)]

1. Apparatus for steering control of a vehicle by a rider including two handlebars fixable in at least two positions, each capable of being moved from a first position to another position by the rider, and capable of being fixed in at least one position by the rider, each of the handlebars pivotally attached to its own mounting block configured to allow the handlebar orientation to be rotated and fixed in a desired position, the pivotal connection between the handlebars and the mounting block facilitating the movement of the handlebars from the first position to the other position by the rider.
2. Apparatus as claimed in claim 1 wherein the handlebars are pivotable independently.
3. Apparatus as claimed in claim 1 wherein the rotation of the handlebars permitted by the first mounting block may be substantially towards or away from the rider, when in a riding position.
4. Apparatus as claimed in claim 1 or 2 wherein the handlebars are pivotally attached to the mounting block via a length adjustment means permitting length-wise adjustment of the handlebars.
5. Apparatus as claimed in any one of claims 1 to 4 wherein the adjustability permits movement between a wide position and an aero position, or a drops wide position and a wide position.

6. Apparatus as claimed in any previous claim wherein the apparatus includes a releasable locking mechanism allowing the handlebars to be releasably locked in the desired position.
7. Apparatus as claimed in any previous claim wherein the handlebars include a gripping area configured to be gripped by the rider, wherein the vehicle control mechanisms, and an actuator for the releasable locking mechanism are accessible from the gripping area.
8. Apparatus as claimed in any previous claim wherein the range of travel of the handlebars from the first position to at least the other position is adjustable.
9. Apparatus as claimed in any previous claim wherein the pivotal movement is substantially arcuate.
10. Apparatus as substantially described herein with reference to and as illustrated by the accompanying drawings.

FIGURE 1

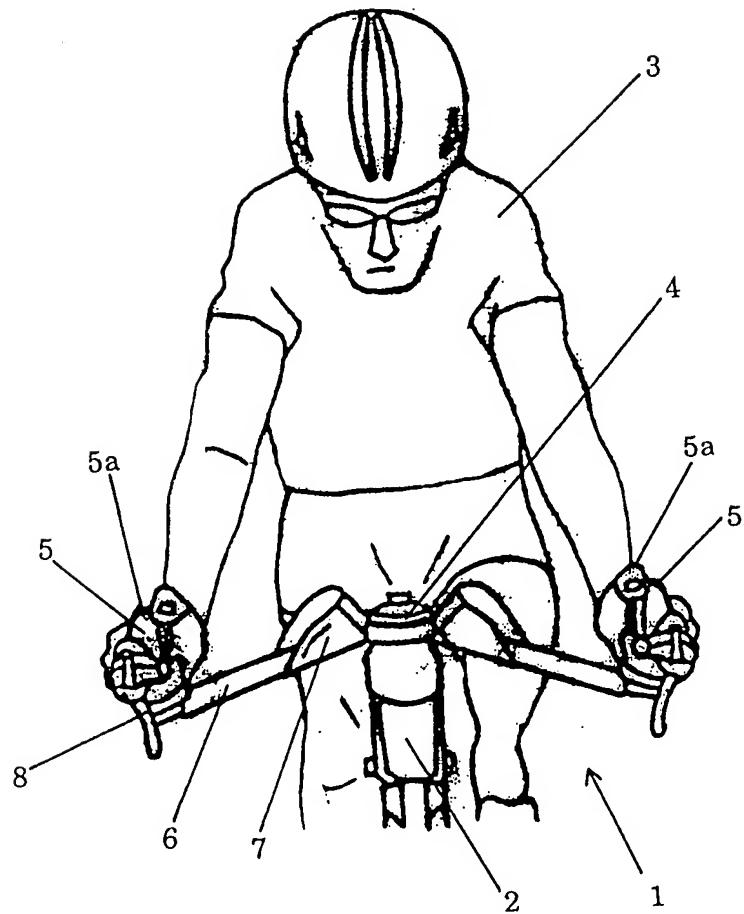


FIGURE 2

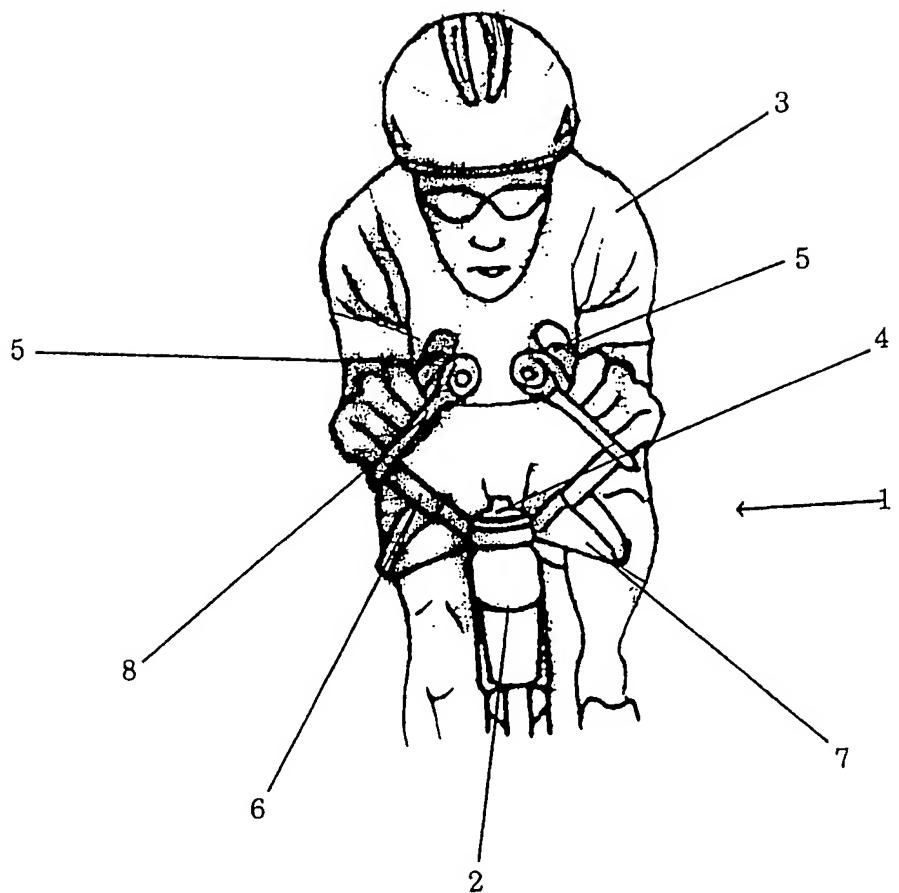


FIGURE 3

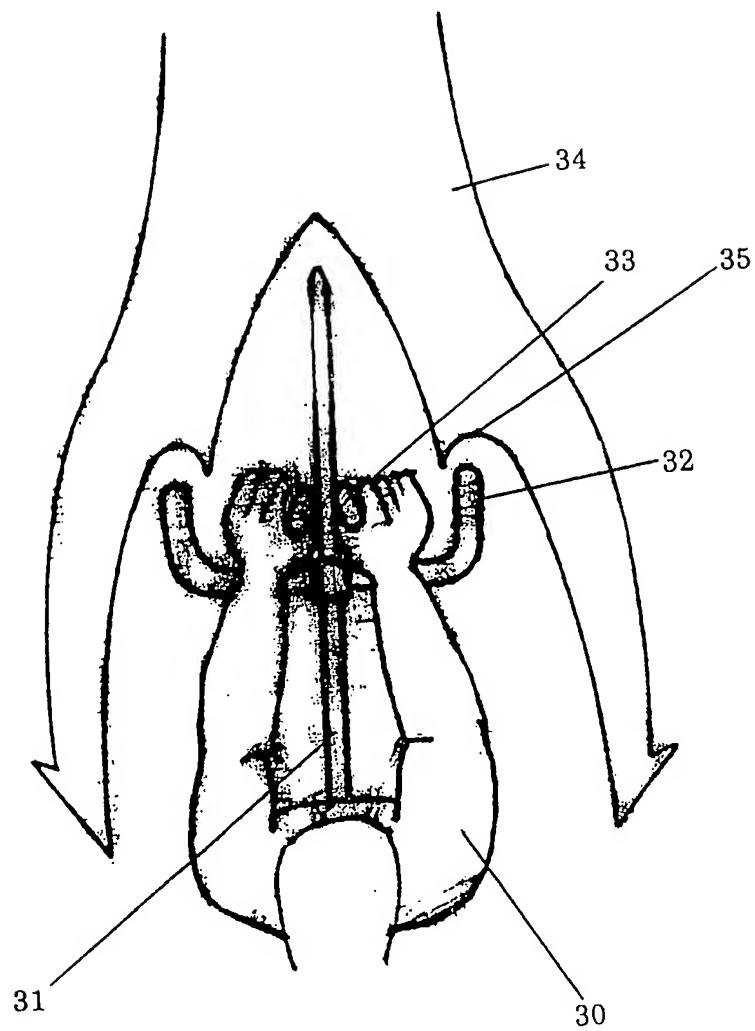
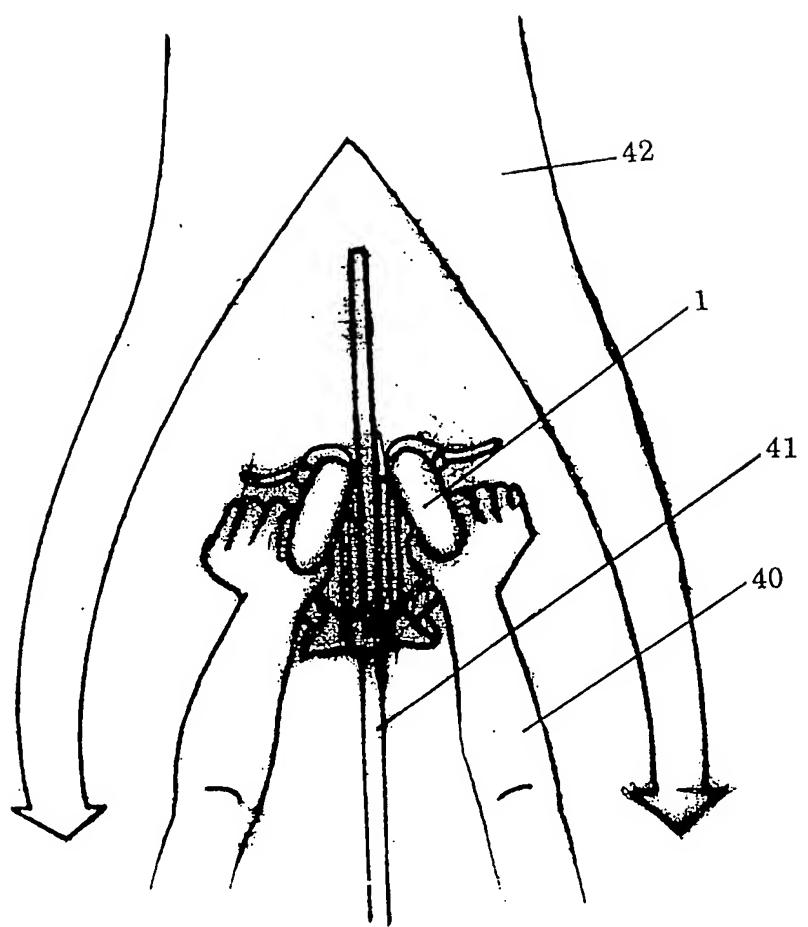


FIGURE 4



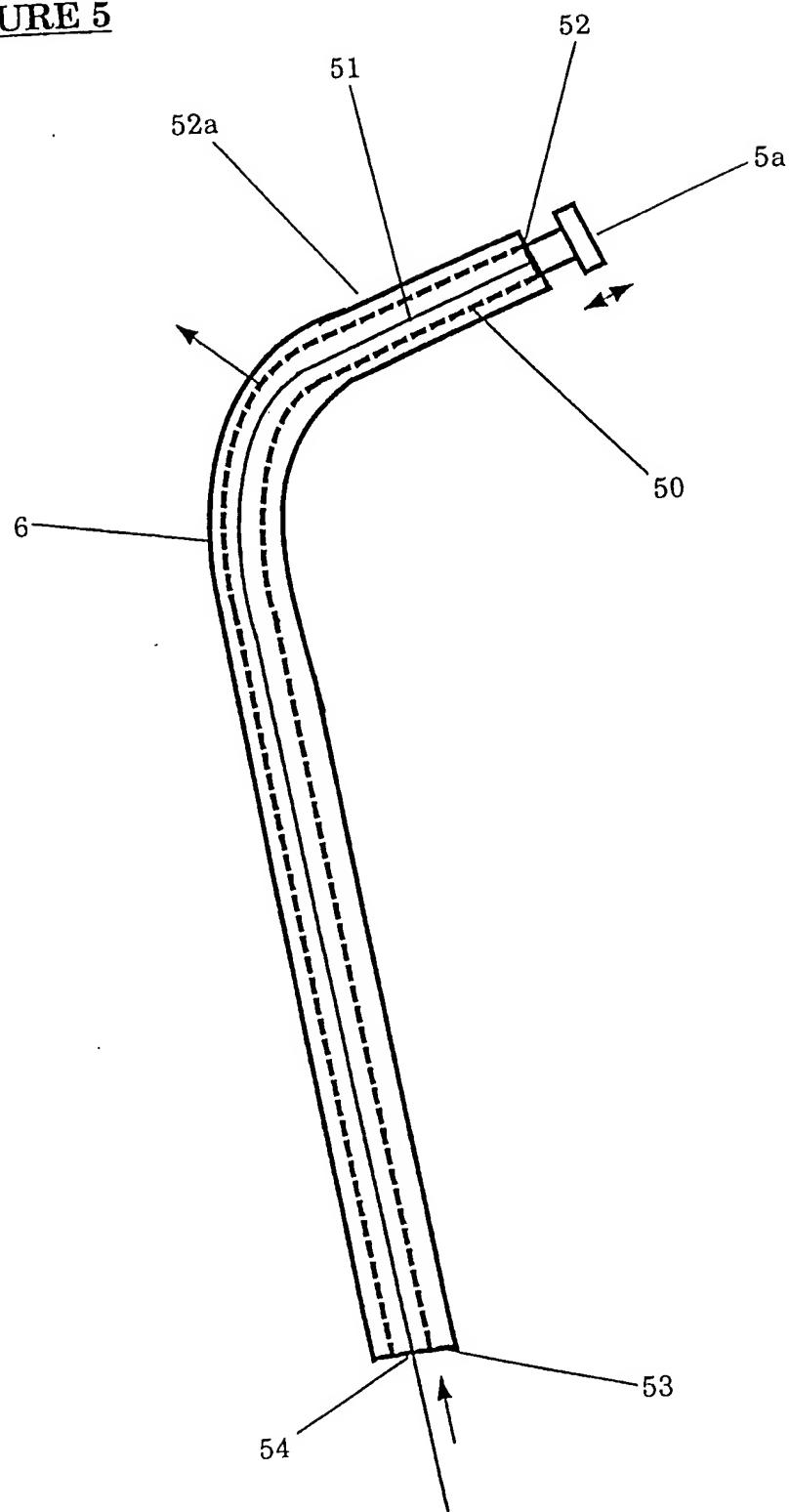
**FIGURE 5**

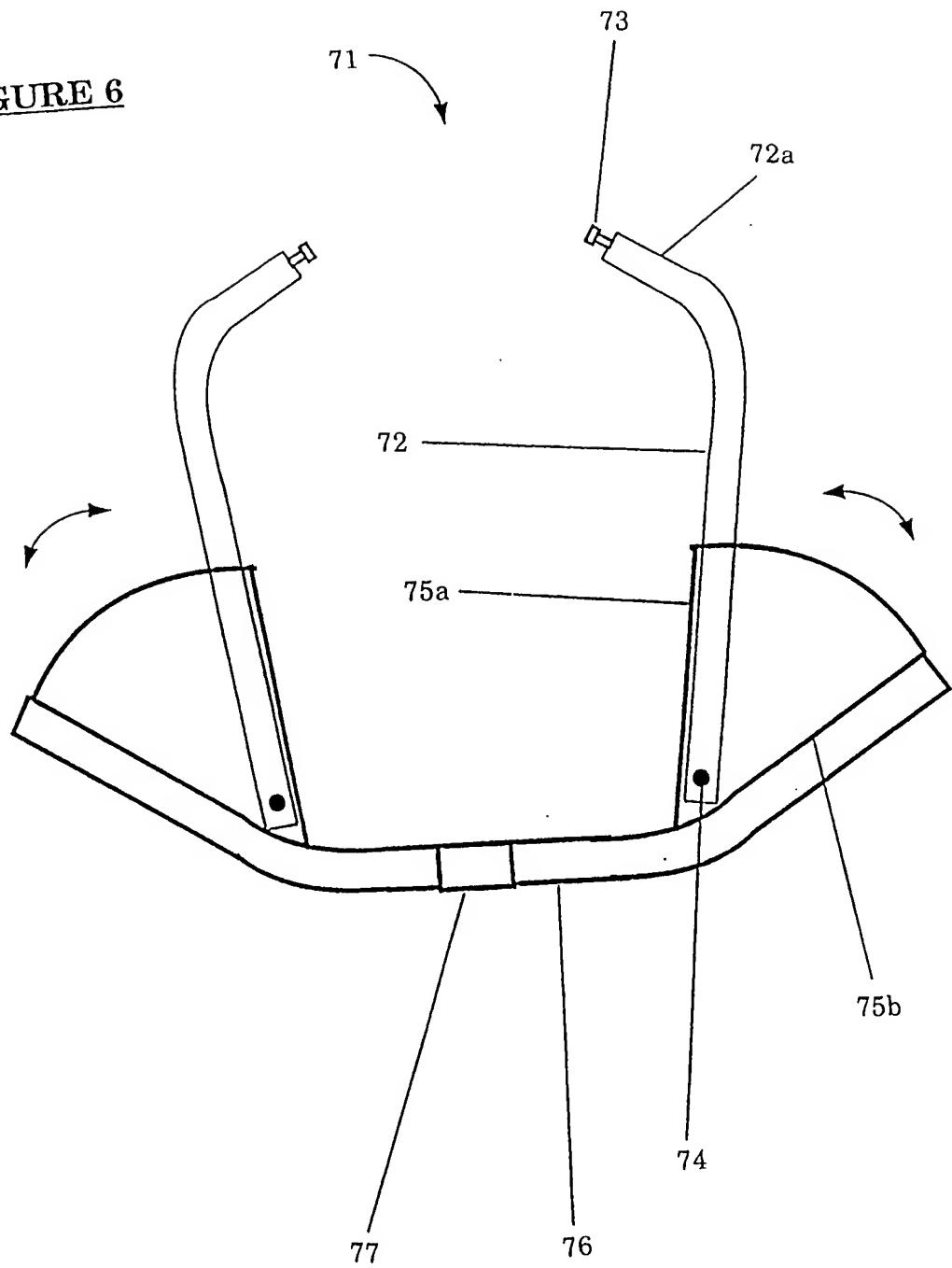
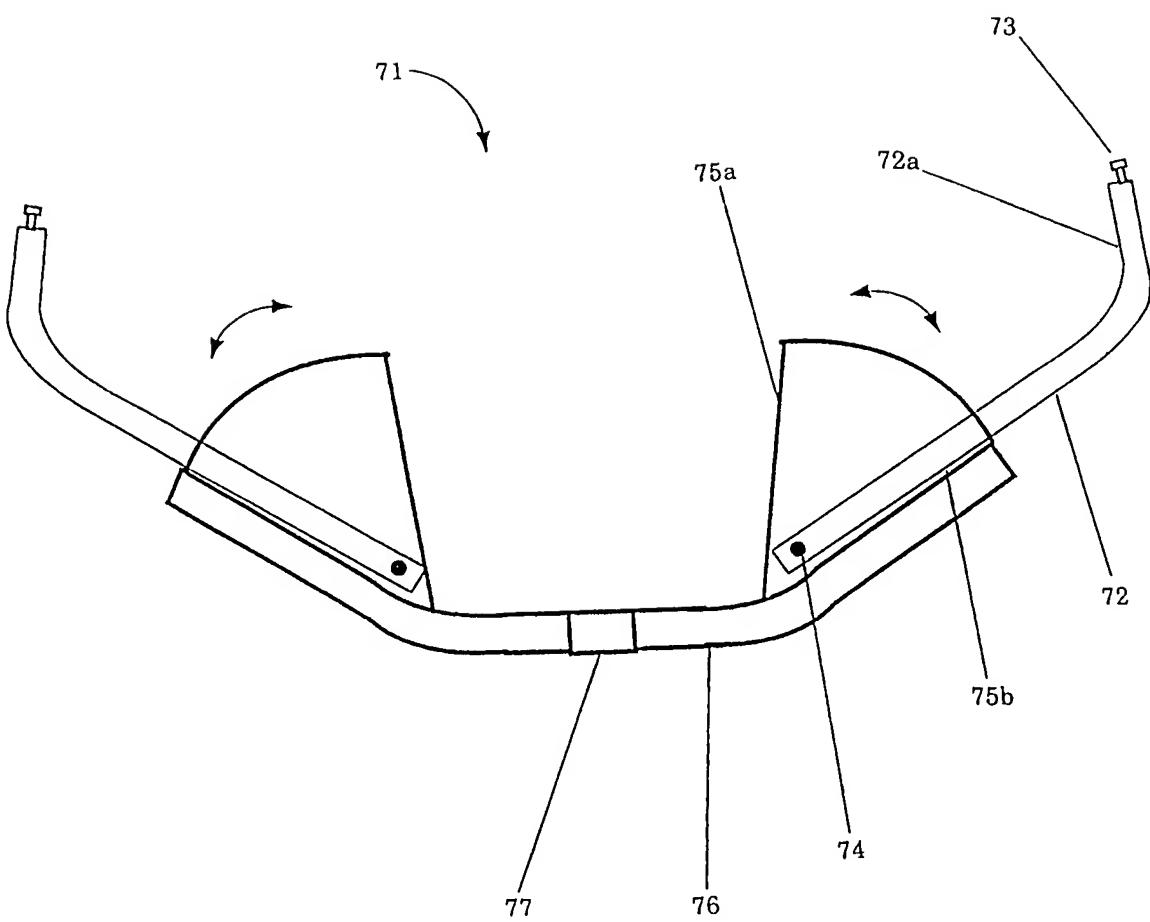
FIGURE 6

FIGURE 7

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/NZ 99/00105

## A. CLASSIFICATION OF SUBJECT MATTER

Int Cl<sup>6</sup>: B62K 21/16

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: B62K 21/16

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
AU: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPAT: B62K 21/16/IC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5737967 A (HARTLEY) 14 April 1998 Whole document	1-12
X	US 5555775 A (D'ALUISIO et al) 17 September 1996 Whole document	1-12
X	US 3863521 A (GATSOS et al) 4 February 1975 Whole document	1-12

 Further documents are listed in the continuation of Box C See patent family annex

## \* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
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- "P" document published prior to the international filing date but later than the priority date claimed

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search  
12 October 1999

Date of mailing of the international search report

18 OCT 1999

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